

HATCHERY EVALUATION REPORT

Bonneville Hatchery - Coho

December 1996

Integrated Hatchery Operations Team (IHOT)

HATCHERY EVALUATION REPORT

Bonneville Hatchery - Coho

An Independent Audit Based on Integrated Hatchery Operations Team (IHOT) Performance Measures

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Section 1

Executive Summary

This report presents the findings of the independent audit of the Bonneville Hatchery - Coho program. The hatchery is located on the Columbia River just west of Cascade Locks, Oregon. The hatchery is used for adult collection, incubation, and rearing of Tule Fall Chinook and URB Fall Chinook and the adult collection and acclimation of coho.

The audit was conducted in 1996-1997 as part of a 2-year effort that will include 67 hatcheries and satellite facilities located on the Columbia and Snake River system in Idaho, Oregon, and

Washington. The hatchery operating agencies include the U.S Fish and Wildlife Service, Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, and Washington Department of Fish and Wildlife.

Background

The audit is being conducted as a requirement of the Northwest Power Planning Council (NPPC) Strategy for Salmon and the Columbia River Basin Fish and Wildlife Program. Under the audit, the hatcheries are evaluated against policies and related performance measures developed by the Integrated Hatchery Operations Team (IHOT). IHOT is a multi-agency group established by the NPPC to direct the development of new basinwide standards for managing and operating fish hatcheries. The Bonneville Power Administration (BPA) contracted with Montgomery Watson to act as an independent contractor for the audit.

IHOT has established five basic policies that cover: (1) hatchery coordination, (2) hatchery performance standards, (3) fish health, (4) ecological interaction, and (5) genetics. The audit focuses on all these policies, with the exception of hatchery coordination. These policies are set forth in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1995)*. That document is the source for the performance measures that are the basis of this audit.

The Audit Process

The audit was based on the facility management's response to a 109-page questionnaire. This audit form was completed through a five-step process in which:

- Information was obtained from headquarters.

- The hatchery manager was asked to fill out and return the audit form.
- A 1-2 day site audit visit was conducted to inspect facilities, review hatchery records, discuss audit form responses, and develop remedial action plans.
- A compliance report was developed to document the compliance status of each performance measure. This report was then shared with the hatchery manager and IHOT representative.
- This hatchery evaluation report was written to document compliance with IHOT performance measures and develop cost estimates for remedial actions when needed.

Bonneville Hatchery - Coho Results

The Bonneville Hatchery facility includes 4 adult holding ponds, 30 converted Burrows ponds, 30 raceways, and incubation facilities. Bonneville Hatchery was constructed in 1909 and was originally funded by the State of Oregon. In 1957 the facility was remodeled and expanded as part of the Columbia River Fisheries Development Program (Mitchell Act) -- a program to enhance declining fish runs in the Columbia River Basin. The hatchery underwent another renovation in 1974 as part of the U.S. Army Corps of Engineer's mitigation of fish losses from the construction of the John Day Dam.

The Bonneville Hatchery - Coho program was in general compliance with most of the performance measures. In the area of program objectives, the hatchery was not meeting its adult return goal. The audit found that the hatchery was not in compliance with the pathology-free water criteria, water quality monitoring requirements, and IHOT QA/QC protocols for feed, which are all facilities requirements. The hatchery needs to develop specific rearing standards for the IHOT Operations Plan, develop smolification goals and monitoring program, and follow

IHOT transportation and sanitation protocols. The hatchery did not have a Genetics Monitoring and Evaluation Program.

The specific areas in which the Bonneville Hatchery - Coho program requires remedial actions based on the IHOT performance measures are listed below. These remedial actions are listed in alphabetical order without intent of ranking or otherwise assigning priority:

- Develop Genetics M&E program
- Develop smolt-to-adult survival goal for IHOT Operations Plan
- Develop smoltification criteria for IHOT and implement measurement program
- Develop written broodstock collection plan and procedures
- Develop written rearing practices and standards for IHOT Operations Plan
- Follow IHOT recommendations for equipment and rain gear sanitation
- Follow IHOT recommendations for monitoring food production
- Follow IHOT transportation protocols
- Improve conditions in ponds used for acclimation
- Review the need for pathogen-free water for rearing and acclimation
- Review Operations Plan with staff
- Run analysis for alkalinity and hardness for Tanner Creek
- Run analysis for contaminants for Tanner Creek
- Run analysis for dissolved oxygen and dissolved nitrogen
- Run analysis for missing water chemistry parameters for Tanner Creek
- Run analysis for nitrite for Tanner Creek
- Run analysis for turbidity for Tanner Creek

Non-compliance issues resulting from items beyond human control or Performance Measures not relevant to this hatchery (Type 1 in Table 3, Section 4 of this report) were not listed above.

Section 2

Facility Description

Name: Bonneville Hatchery
Stock/Species: Tule Fall Chinook, URB Fall Chinook, Spring Chinook, and Coho
Operating Agency: Oregon Department of Fish and Wildlife
Funding Agency: Receives funding from both the National Marine Fisheries Service (NMFS) and U.S. Army Corps of Engineers (COE)
Location: Just west of Cascade Locks, Oregon at Bonneville Dam on the Columbia River
Address: Bonneville Hatchery
Oregon Department of Fish and Wildlife
Star Route B, Box 12
Cascade Locks, OR 97014

Hatchery Manager: Mr. Dan Barrett
Phone (503) 374-8393
Fax: (503) 374-8090 (fax)

Purpose: Bonneville Hatchery was constructed in 1909 and was originally funded by the State of Oregon. In 1957 the facility was remodeled and expanded as part of the Columbia River Fisheries Development Program (Mitchell Act), a program to enhance declining fish runs in the Columbia River Basin. The hatchery underwent another renovation in 1974 as part of the U.S. Army Corps of Engineer's mitigation of fish losses from the construction of the John Day Dam.

This hatchery provides fish for the ocean and river fisheries and eggs to other programs.

Production Goal: **URB Fall Chinook**
2,900,000 eggs to Umatilla Hatchery
2,830,000 fingerlings (37,875 lb) for release in the Columbia
5,325,000 smolts and fingerlings (112,750 lb) for on-station releases

225,000 smolts (28,125 lb) for release in the Umatilla River

Tule Fall Chinook

9,100,000 fry (34,000 lb) for transfer to Stayton Ponds

7,950,000 fingerlings (123,080 lb) for on-station releases

2,000,000 fingerlings (40,000 lb) for release in Tanner Creek
from the Stayton Ponds

Spring Chinook

125,000 Deschutes stock smolts (15,554 lb) for release into the
West Fork Hood River

Coho

1,175,00 smolts (90,384 lb) for on-site release

Total Production: 481,769lb

Water Supply:

Gravity supply from Tanner Creek
Wells

Facilities:

Incubation:

152 16-tray vertical incubators
60 bulk incubators (space for 10 baskets each)

Adult Holding

Upper Pond (North) - 32,785 cf
Upper Pond (South) - 32,785 cf
Lower Pond - (Upper Side) - 11,288 cf

Lower Pond - (Lower Side) - 14,502 cf

Raceways

Battery A - 22 converted Burrow ponds - 3,188 cf each

Battery B - 8 converted Burrow ponds - 3,188 cf each

Battery C & D - 30 raceways - 4,000 cf each

Adult Holding Ponds - 4 ponds, 91,360 cf total

Satellite Facilities

None

Compliance Status

The hatchery audits are based on compliance with written IHOT performance measures. These performance measures are documented in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (referred to as *IHOT 1995* in this report).

The purpose of the performance measures is to implement new basinwide policies that provide regional guidelines for operating anadromous hatcheries in the Columbia Basin.

The audit focuses on performance measures for IHOT policies that cover (1) hatchery performance standards, (2) fish health, (3) ecological interaction, and (4) genetics. These performance measures are intended to guide hatchery operations once production is established. For that reason, the hatchery operations audit included broodstock collection, spawning, incubation of eggs, fish rearing and feeding, fish release, equipment maintenance and operations, and personnel training. Production priorities are beyond the scope of this audit.

Based on *IHOT 1995*, a detailed 109-page audit form was developed. The audit form divided the performance measures into six major sections along major program and technical criteria areas. Two additional sections (sections 1 and 8) include general information and expenditure information needed for this Hatchery Evaluation Report and blank forms for additional comments. The following is the basic structure of the IHOT audit form:

Section 1	Performance Measures for General Information and Expenditure Information (PMs General 1-2)
Section 2	Performance Measures for Program Objectives (PMs 1-4)
Section 3	Performance Measures for Facility Requirements (PMs 5-15)

Integrated Hatchery Operations Team (IHOT) 1995. *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries*, Bonneville Power Administration, Portland, Oregon.

Section 4	Performance Measures for Hatchery Practices (PMs 16-25)
Section 5	Performance Measures for Fish Health Policy (PMs 26-34)
Section 6	Performance Measures for Ecological Interactions (PMs 35-38)
Section 7	Performance Measures for Genetics Policy (PMs 39-43)
Section 8	Blank Forms for Additional Comments

Several performance measures are repeated in various sections of the audit form. These performance measures overlap in *IHOT 1995* and were retained to allow individuals interested in specific portions of the audit (such as Genetics or Fish Health) to determine the compliance status of all performance measures for a given topic in one location. A repeated performance measure is indicated by shaded text.

The Hatchery Audit Process

The hatchery audit will be conducted over a 2-year period that concludes in 1997. At each hatchery, a five-step process was used to complete the overall hatchery audit.

This process consisted of research and onsite visits. The site visit at the Bonneville Hatchery was conducted on October 28, 1996.

The following is the five-step audit process:

1. Information was obtained from headquarters.
2. The hatchery manager was asked to fill out and return the **Audit Form**.
3. A 1-2 day site audit visit was conducted at each hatchery. During that visit an audit team inspected facilities, reviewed hatchery records, discussed audit form responses, and developed remedial action plans when appropriate.

4. During the site visit, the compliance status of each performance measure was discussed with the hatchery manager and IHOT representative. A portion of the Hatchery Evaluation Report was sent to the hatchery manager following the audit visit as a **Compliance Report**. That Compliance Report is Table 2 of this report.
5. Information from steps 1-4 was used to prepare a draft **Hatchery Evaluation Report**. This draft report was submitted to the operating agencies for review of the information used to determine compliance. Based on review and comments, a final Hatchery Evaluation Report was developed. The final report documents the compliance of a particular hatchery with the IHOT performance measures and presents cost estimates to correct any deficiencies.

Compliance Status of Bonneville Hatchery - Coho

The following table includes information on life-stages that are held on this facility for some portion of their rearing cycle (Table 1). For multi-facility programs, summary cost and contribution data is presented at the facility where rearing occurs. For the compliance status relating to performance measures that do not occur at this hatchery, please refer to the Hatchery Evaluation Reports for the hatcheries and stocks listed in Table 1. A check mark (4) indicates that the specific life-stage is held at this facility.

This section documents the compliance status of the Bonneville Hatchery - Coho program. Each performance measure is presented in a table taken from the audit form (Table 2). The compliance status is identified by the following categories:

- **N/A** (not applicable)
- **Yes** (in compliance)
- **?** (unknown; generally due to unavailability of information to determine compliance)
- **No** (not in compliance).

Remedial actions are suggested for performance measures not in compliance. These remedial actions are grouped into categories and listed in Section 4 of this report, where the cost of the required remedial actions is also presented.

Table 1 Summary Program Information for Bonneville Hatchery - Coho

Component	Location of Adult Holding, Spawning, Incubation, and Rearing					
	Bonneville Hatchery	Cascade Hatchery	Oxbow Hatchery			
Adult Collection	4					
Adult Holding		4				
Spawning		4				
Fertilization		4				
Incubation						
green-to-eyed		4				
eyed-to-hatch		4				
Rearing						
fry		4				
fingerlings		4	4			
smolts			4			
Acclimation/release	4					

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#1	Are the hatchery programs outlined in a subbasin management plan?		4			Columbia Basin System Planning Production Plan and John Day mitigation; U.S. v. Oregon; Mitchell Act	
#2	Is the hatchery operating under a current hatchery operational plan? Is it understood by staff? Is it being followed?		4		4 4	IHOT Operations Plan	Review operations plan with staff Review operations plan with staff
#3	Is a hatchery monitoring and evaluation plan in place? Do you have a written monitoring and evaluation plan?		4			CWT program. Review Missing Production Group Report	
#4a	Adult contribution to fisheries, spawning grounds, and hatchery		4			Review of records. Missing Production Group Report	
#4b	Adult pre-spawning survival as compared with established goal	4				At Cascade Hatchery	
#4c	Egg-take as compared with established hatchery goal	4				At Cascade Hatchery	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

		N/A	Yes	?	No		
#4d	Green-egg to eyed-egg survival as compared with established goal	4				At Cascade hatchery	
#4e	Eyed-egg to fry survival as compared with established goal	4				At Cascade Hatchery	
#4f	Fry to smolt survival as compared with established goal	4				At Cascade Hatchery	
#4g	Production as compared with established goal				4	Review of records; in compliance 3 out of last 5 years. Mortality during acclimation.	Improve conditions in ponds used for acclimation of coho
#4h	Percent survival (smolt to adult) as compared with established goal				4	No goal established	Develop smolt to adult survival goal for IHOT Operations Plan
#4i	Number of eggs, fry, fingerlings, smolts, and/or adults to meet basinwide needs	4				Rearing at Cascade Hatchery	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#5a	Temperature						
	Does your water temperature meet the criteria for spawning?	4				No spawning at this station	
	Does your water temperature meet the criteria for incubation?	4				No incubation at this station	
	Does your water temperature meet the criteria for rearing?		4			Review of temperature data for Tanner Creek/Discussion	
#5b	Dissolved gases						
	Is the oxygen level near saturation?			4		No data. No problems experienced	Run analysis for dissolved oxygen and dissolved nitrogen
	Is the dissolved nitrogen level less than saturation?			4		No data. No problems experienced	See above
#5c	Chemistry						
	Ammonia (un-ionized)		4			Review of one set of data for Tanner Creek/Discussion	
	Carbon Dioxide				4	See above	Run analysis to confirm
	Chlorine		4			See above	
	pH			4		No data	Run appropriate analyses for Tanner Creek supply
	Copper			4		No data	See above

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

		N/A	Yes	?	No		
	Hydrogen Sulfide		4			Review of one set of data for Tanner	
	Iron		4			Creek/Discussion	
	Zinc				4	See above	Unknown
#5d	Turbidity						
	Does your turbidity meet the criteria?			4		No data	Run analysis for turbidity for Tanner Creek

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#5e	Alkalinity and hardness Does your alkalinity and hardness meet the criteria?				4	One sample	Run analysis for turbidity of Tanner Creek
#5f	Nitrite Does your nitrite meet the criteria?				4	One sample with "trace" value	Run analysis for Tanner Creek
#5g	Contaminants Aldrin Endrin Dieldrin Heptachlor Chlordane Methoxychlor Lindane Malathion Guthion			4 4 4 4 4 4 4 4 4		No data No data No data No data No data No data No data No data No data	Run analysis for contaminants See above See above See above See above See above See above See above See above
#5h	Pathogens What portions of the hatchery have disease-free water? Adult holding Incubation	 4 4				 Not on station Not on station	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

		N/A	Yes	?	No		
	Early rearing	4				Not on station	
	Rearing		4			Some; but not enough for total demand	Review IHOT criteria for disease-free
	Others	4					water for rearing

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#6	Alarm Systems						
	Do the following areas have alarms?						
	Intake		4			Inspection of facilities/Discussion	
	Large rearing ponds and adult holding ponds		4			Inspection of facilities/Discussion	
	Raceway headboxes and rearing ponds		4			Inspection of facilities/Discussion	
	Incubation facilities		4			Inspection of facilities/Discussion	
	Quarantine areas and facilities		4			Inspection of facilities/Discussion	
	Water treatment systems	4				None on station	
	Security				4	Inspection of facilities/Discussion	Install security alarms
	Are there outside systems and buzzers in onsite residences?		4			Discussion	
	Are water flow alarms checked daily?		4			Review of records/Discussion	
	Are all other alarms checked weekly?		4			Discussion	
	Is there a log of alarms for emergencies, tests, and maintenance requirements?		4			Review of records/Discussion	
	Are telephone pagers used?				4	Phones hard-wired to on-site residences	Install telephone pagers

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

		N/A	Yes	?	No		
#7	Adult collection and holding facilities						
	Do you meet the adult holding criteria?	4				Adults held at Cascade Hatchery	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#8	Incubation facilities						
	Type 1: _____ Do you have an adequate number of units for the overall program?	4				Eggs incubated at Cascade Hatchery	
#9	Type 2: _____ Do you have an adequate number of units for the overall program?	4				Eggs incubated at Cascade Hatchery	
	Rearing facilities						
	Type 1: Adult Holding Ponds Do you have an adequate number of units for the overall program?		4			Inspection of facilities/Discussion	
	Type 2: _____ Do you have an adequate number of units for the overall program?	4					
	Type 3: _____ Do you have an adequate number of units for the overall program?	4					

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

		N/A	Yes	?	No		
#10	Screening facilities						
	Do you meet the approach velocity criteria?		4			Data from ODF&W	
	Are the fish screens regularly cleaned?		4			Data from ODF&W	
	Does the screen mesh meet screen opening criteria?		4			Data from ODF&W	
	Are rearing containers double screened for fish that should not be released to adjacent water?	4				Coho are released in Tanner Creek	
#11	Predator control facilities						
	Are your predation control facilities effective?		4			Losses occur but are tolerable	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#12	Food storage facilities and quality control						
	Does the storage of dry/semi-moist/moist foods (dry<12%; semi-moist 12-20%; moist >20% moisture) follow food manufacturer's recommendations?		4			Discussion	
	Does a regional quality control officer oversee production procedures and monitor:						
	Verification by feed manufacturer that ingredients meet specifications?				4	Discussion with ODF&W regional quality control (QC) officer	Follow IHOT recommendation for monitoring of food production
	Ensure feed does not contain unwanted drugs or other additives?				4	Discussion with ODF&W regional quality control (QC) officer	See above
	Analyze ingredients contained in the final food product to ensure that feed specifications have been met?				4	Discussion with ODF&W regional quality control (QC) officer	See above
	Are the foods stored and handled according to the following criteria?						

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

		N/A	Yes	?	No		
	Moist pellets should not exceed 10°F at point of delivery.		4			Discussion	
	Moist pellets should be removed from freezer just prior to feeding.		4			Discussion	
	Do not leave buckets of feed or feed containers outside exposed to light or heat.		4			Discussion	
	Open bags of feed should be fed within 1 to 2 days except when feeding small groups of fish.		4			Discussion	
	Automatic feeder hoppers and bulk storage facilities should be insulated against excessive temperatures (80°F and above).		4			Discussion	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#13	Release facilities Do the release facilities ensure that fish are not subjected to adverse conditions?		4			Discussion	
#14	Pollution abatement facilities Do the pollution abatement facilities meet all federal and state regulations (or good engineering practice)? Are pollution abatement facilities operated correctly?		4 4			Inspection of facilities/Discussion Discussion	
#15	Transportation facilities Are the transport systems adequate to meet IHOT performance measures for transportation practices?		4			Inspection of facilities/Discussion	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#16	Broodstock selection practices						
	Is the donor selection process document attached? (PM #40a)	4				Existing program; does not apply	
	Was the donor selection outline followed in selecting the hatchery broodstock? (PM #40b-c)	4				Existing program; does not apply	
#17	Spawning practices						
	Were the appropriate number of spawners, male/female ratios, and fertilization protocols used? (PM #42c-g)	4				Spawning at Cascade Hatchery	
#18	Incubation practices						
	Are specific incubation standards listed in the hatchery operations plan?	4				Incubation at Cascade Hatchery	
	Are incubation practices written?	4				See above	
	Incubation Type 1: see PM #8)	4				See above	
	Do you meet the loading and flow criteria?						

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

		N/A	Yes	?	No		
	Incubation Type 2: (see PM #8) Do you meet the loading and flow criteria?	4				See above	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#19	Rearing practices						
	Are specific rearing standards listed in the hatchery operations plan?				4	Review IHOT Hatchery Operations Plan. Standards and practices not written	Develop written rearing practices and standards for IHOT operations plan
	Are rearing practices written? Rearing Unit Type 1: Adult Holding Ponds (see PM #9)				4	See above	
	Do you meet the density and DI criteria?			4		Review of records/Discussion	See above
	Do you meet the Loading and FI criteria?			4		Review of records/Discussion	See above
	Rearing Unit Type 2: (see PM #9)						
#20	Do you meet the density and DI criteria?						
	Do you meet the Loading and FI criteria?						
	Rearing Unit Type 3: (see PM #9)						
	Do you meet the density and DI criteria?						
	Do you meet the Loading and FI criteria?						

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

		N/A	Yes	?	No		
	Do you produce a high quality smolt?				4	Discussion. Adult holding ponds require rebuilding/modification for smolt use.	Improve rearing conditions in the adult holding ponds through provision of pathogen-free water

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#21	Fish health management practices						
	Are the monthly hatchery monitoring visits being conducted? (PM #26)		4			Review of records/Discussion	
	Are the annual broodstock inspections being conducted? (PM #27)		4			Review of records/Discussion	
	Is there pathogen-free water (PM #5h) and are the sanitation procedures being followed? (PM #28)				4		See PM #28
	Are the following water quality parameters within criteria? (PM #5a-5g)						
	Water temperature		4			Review of data	
	Dissolved gases			4		No data	See PM #5b
	Chemistry				4	No data for some parameters	See PM #5c
	Turbidity			4		No data	See PM #5d
	Alkalinity and hardness				4	Limited data	See PM #5e
	Nitrite				4	Limited data	See PM #5f
	Contaminants			4		No data	See PM #5g
	Are rearing standards being followed? (PM #19)				4	Develop written standards	See PM #19

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

		N/A	Yes	?	No		
	Are egg and fish transfer/release requirements met? (PM #31)		4			Discussion	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#22a	Does hatchery performance meet requirements outlined in the regional hatchery policies and in subbasin and hatchery plans for the following areas?						
#22a1	Percent smoltification Do you measure percent smoltification? Did you meet the smoltification criteria?			4	4	Discussion Discussion	Develop smoltification criteria for IHOT and implement measurement program See above
#22a2	Rearing density (prior to release) Did you meet the rearing density criteria just prior to release?			4		Discussion	See PM #19
#22a3	Disease condition (at release) Did you meet all disease regulations just prior to release?		4			Discussion	
#22a4	Number (at release) Did you meet the release number goal?				4	Discussion	See PM #4g
#22a5	Size at release Did you meet the size goal?		4			Discussion	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

		N/A	Yes	?	No		
#22a6	Dates of release						
	Did you meet the release date goal?		4			Discussion	
#22a7	Location of release						
	Did you release the fish at the specified location?		4			Discussion	
#22b	Are fish reared in the subbasin or acclimated in the subbasin?						
	Are the fish reared in the subbasin?		4			Discussion	
	Are the fish acclimated in the subbasin?		4			Discussion	
#22c	Is the release strategy appropriate for the program?		4			Discussion	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#23	Transportation facilities						
	Do transportation equipment and personnel receive disinfection before and after use?		4			Discussion	
	Is the fish tank interior disinfected using a solution of 200 ppm active chlorine for 30 minutes minimum or formaldehyde gas generation method (relative humidity of 60% for 2 hrs)?				4		Follow IHOT transportation protocols
	Is the exterior of the fish transport vehicle disinfected using high pressure steam (115-130°C), high temperature acid, or with 200 ppm chlorine for 30 minutes?		4			Discussion	
	Is the fish transport vehicle (cab) disinfected using 600 ppm quaternary ammonia compounds (1.5 ml of 50% stock solution/liter water)?			4		Uncertain	Follow IHOT transportation protocols
	Is other equipment disinfected including fish pumps, nets, egg sorters, waders, boots, rain gear, hoses and other equipment using one of the following solutions?		4			Discussion	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

		N/A	Yes	?	No		
	200 ppm chlorine for 30 minutes 600 ppm quaternary ammonia compound for 30 minutes 200 ppm iodophor solution for 10 minutes		4			Discussion	
	Do personnel wear protective garments when handling fish eggs or cultural water?	4				N/A to Coho program	
	Do the fish transport truck/chassis and tank/unit receive an inspection and service prior to the release season?		4			Discussion	
	Is a daily service inspection completed before starting up and leaving for the day?		4			Discussion	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#23 (cont)	Transportation facilities						
	Does the fish transport unit receive an inspection prior to loading?		4			Discussion	
	Does a pre-loading inspection covering tank water level, pumps or aerators, oxygen injection system settings, displacement gauge, and truck loading/hauling density tables checked and reviewed occur prior to loading fish in the transport unit?		4			Discussion	
	Do hauling criteria include checking the fish 45 minutes to 1 hour after loading?		4			Discussion	
	When fish are active and systems are functioning properly, is the oxygen concentration reduced and maintained at approximately 8 ppm?		4			Discussion	
	Is water temperature in the transportation unit maintained within the 42-48 °F range?		4			Discussion	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

		N/A	Yes	?	No		
	Do fish releasing procedures include the following criteria?						
	Releasing the fish at the correct release site or into the correct water body.		4			Discussion	
	Tempering or the difference between the liberation tank and the target water body should not exceed 10°F.		4			Discussion	
	The liberation hose should be angled so that fish gently hit the water. Using a tripod is a method of ensuring the hose will stay at the proper angle.		4			Discussion	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#24	Evaluation practices						
	Has the hatchery conducted fishery contribution studies to:						
	Determine the requirements for evaluating and improving management programs?		4			CWT tagging program	
	Develop guidelines that define the geographical area and identify component stocks (hatchery and/or wild) that comprise the management unit?		4			CWT tagging program	
	Develop guidelines that define if the proper stocks of fish are currently being used?		4			CWT tagging program	
	Determine which management units contribute to a specific fishery and the time periods of those contributions?		4			CWT tagging program	
	Determine the relative contributions of the various management units to a specific fishery over the different time periods?		4			CWT tagging program	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#25	Training practices						
	Does the hatchery have a training schedule for its staff?		4			Discussion	
	Does each staff member have a personal training plan approved by a supervisor and reviewed annually?		4			Discussion	
	Does the hatchery routinely exchange training details between other hatcheries and agencies?		4			Discussion	
	Does the hatchery encourage and reward off-duty training of staff?		4			Discussion	
	Does the hatchery conduct monthly staff meetings?		4			Discussion	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#26	Are monthly hatchery monitoring visits being conducted by a qualified fish health specialist as described below?						
	Conduct visit at least monthly		4			Based on review of regional lab	
	Monitoring conducted by qualified fish health specialist		4			Based on review of regional lab	
	Examine a representative sample of healthy and moribund fish from each lot.		4			Based on review of regional lab	
	Review fish culture practices with hatchery manager.		4			Based on review of regional lab	
	Report finding and results of necropsies on standard form.		4			Based on review of regional lab	
	Recommend appropriate drug or chemical treatment.		4			Based on review of regional lab	
	Summarize fish health status or stock prior to release or transfer to another facility.		4			Based on review of regional lab	
#27	Are all of the functions of the hatchery yearly monitoring visits being completed as described below?						

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

		N/A	Yes	?	No		
	Annually examine each broodstock for the presence of reportable viral pathogens.		4			Review of records/Discussion	
	Annually screen each salmon broodstock for the presence of <i>Renibacterium salmoninarum</i> .		4			Review of records/Discussion	
	Conduct inspection by or under the supervision of qualified fish health specialist.		4			Review of records/Discussion	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#28	Is the hatchery following accepted sanitation procedures?						
	Are there any sources of pathogen-free water, especially for incubation and early rearing?	4				No incubation/early rearing of Coho	
	Are the hatchery sanitation procedures understood and being followed as described below?						
	Disinfect/water harden eggs in iodophor?	4				See above	
	Are foot baths containing disinfectant placed at the incubation facility's entrance and exit?	4				See above	
	Is equipment and rain gear utilized in broodstock handling or spawning sanitized prior to its use elsewhere in the hatchery?			4		Sometimes	Follow IHOT recommendations for equipment and rain gear sanitation
	Is equipment used to collect dead fish sanitized prior its use in another pond and/or lot of fish?		4			Discussion	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

		N/A	Yes	?	No		
	Is equipment, including vehicles used to transfer fish between facilities, disinfected prior to use with any other fish lots or at any other location?		4			Discussion	
	Are rearing vessels sanitized after fish are removed and prior to introducing a new fish lot or stock?		4			Discussion	
	Are dead fish properly disposed of?		4			Discussion	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#29	Are water quality parameters being followed?						
	Are the following water quality parameters within criteria? (PM #5a-5g)						
	Water temperature		4			Review of data	
	Dissolved gases			4		No data	See PM #5b
	Chemistry				4	No data for some parameters	See PM # 5c
	Turbidity			4		No data	See PM #5d
	Alkalinity and hardness				4	Limited data	See PM #5e
	Nitrite				4	Limited data	See PM #5f
	Contaminants			4		No data	See PM #5g
	Go to PM #21						
#30	Are incubation and rearing standards being followed?						
	Are the incubation practices following the IHOT incubation criteria? (PM #18)	4				Incubation at Cascade Hatchery	
	Are the rearing practices following the IHOT criteria? (PM #19)			4		Discussion	See PM #19
	Go to rearing practices PM #18-PM #19						
#31	Are egg and fish transfer/release requirements met?		4			Discussion	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#32	Is the hatchery's program outlined in a subbasin management plan? Go to subbasin plan PM #1		4			Columbia Basin System Planning Production Plan and John Day mitigation; U.S. v. Oregon	
#33	Is the hatchery operating under a current hatchery operational plan? Go to operational plan PM #2		4			Review IHOT Operations Plan	
#34	Is a hatchery monitoring and evaluation plan in place? Go to hatchery monitoring and evaluation plan PM #3		4			M&E program described in IHOT Operations Plan	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#35	Does the hatchery program meet requirements established in the regional hatchery policies and subbasin planning documents in the following areas: species, stock, broodstock collection location, broodstock numbers, broodstock collection strategy, and spawning and egg-take protocols?						
	Does the hatchery program meet the requirements for the following?						
	Species protocols (PM #4a)		4			Discussion	
	Stock protocols (PM #4a)		4			Discussion	
	Broodstock collection location protocols (PM #41b)		4			Discussion	
	Broodstock numbers protocols (PM #42c)	4				Broodstock transfered to Cascade Hatchery	
	Broodstock collection strategy protocols (PM #41b-d)		4			Discussion	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

		N/A	Yes	?	No		
	Spawning protocols (PM #42d-e)	4				Occurs at Cascade Hatchery	
	Egg-take protocols (PM #42f-g)	4				Occurs at Cascade Hatchery	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#36	Does the hatchery's performance meet requirements outlined in the regional hatchery policies and in subbasin and hatchery plans for the following areas: percent smoltification, rearing density, disease condition, and the number, size date(s), and location of release?						
	Percent smoltification (PM #22a1)				4	No written criteria	See PM #22a1
	Rearing density (PM #22a2)			4		No written criteria	See PM #22a2
	Disease condition (PM #22a3)		4			Discussion	
	Number at release (PM #22a4)		4			Discussion	
	Size at release (PM #22a5)		4			Discussion	
	Date of release (PM #22a6)		4			Discussion	
	Location of release (PM #22a7)		4			Discussion	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

		N/A	Yes	?	No		
#37	Are fish reared in the subbasin or acclimated in the subbasin? See PM #22b		4			Discussion	
#38	Is the release strategy appropriate for the program? See PM #22c		4			Discussion	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#39	For new programs, has a broodstock collection plan been developed?						
	Is the broodstock collection plan written?	4				Existing Program; does not apply	
	For a non-captive broodstock program:	4				Existing Program; does not apply	
	Was an unbiased, representative sample collected?						
	Was the recommended number of broodstock collected?	4				Existing Program; does not apply	
	For a captive broodstock program:						
	Were captive brood progeny excluded as donors for propagating the next generation of the captive broodstock program?	4				Existing Program; does not apply	
	Were full-sib crosses avoided?	4				Existing Program; does not apply	
	Is the broodstock collection plan understood and being followed by staff?	4				Existing Program; does not apply	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

		N/A	Yes	?	No		
#40	For a new program, was the donor selection outline followed in selecting the hatchery broodstock?						
#40a	Is a donor selection plan written?	4				Existing Program; does not apply	
#40b	Was the donor selection outline followed in selecting the broodstock?	4				Existing Program; does not apply	
#40c	Was the target stock recommended in the donor selection process actually used?	4				Existing Program; does not apply	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#41	For existing programs, were the broodstock collection procedures followed?						
#41a	Is the broodstock collection plan written?				4	No written plan	Develop written broodstock collection plan and procedures
	Does the broodstock collection plan follow the guideline:						
#41b	Was an unbiased, representative sample collected?		4			Discussion	
#41c	Was the recommended number of broodstock collected?		4			Discussion	
#41d	Were the broodstock collection procedures in hatchery operation plan understood and followed?		4			Discussion	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#42	Was the appropriate number of spawners, male/female ratios, and fertilization protocols used?						
#42a	Are the spawning protocols written?	4				At Cascade Hatchery	
#42b	Are daily or weekly spawning logs available?	4				At Cascade Hatchery	
#42c	Was the appropriate number of spawners used?	4				At Cascade Hatchery	
#42d	Did you attempt to spawn all collected broodstock and randomize mating with respect to age class, and other traits?	4				At Cascade Hatchery	
#42e	Was the sex-ratio within the limits given in the performance standards?	4				At Cascade Hatchery	
#42f	Were the fertilization protocols followed?	4				At Cascade Hatchery	
#42g	If the hatchery needed to reduce the number of eggs retained, was this done by representative sampling of each male/female cross?	4				At Cascade Hatchery	

Table 2 Bonneville Hatchery - Coho Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#43	Is there a genetics monitoring and evaluation program in place?						
	Is a genetics monitoring and evaluation program available?				4		Develop genetics M&E program
	Does the plan address the following elements listed in IHOT:						
	Does the program have elements needed to meet evaluation goals 1-4?				4		
	Has a qualified geneticist reviewed and endorsed the program (goal 5)?				4		
	Will the program collect the data and maintain the records needed to evaluate compliance on an ongoing basis (goal 5)?				4		
	Is the program understood and followed by staff?				4		

Remedial Actions

Based on the compliance status for each performance measure, remedial actions were developed. The required remedial actions are organized into five categories. The types of categories range across a spectrum from those actions that are beyond human control, to those that require a change in agency policy or procedures, to those that involve a significant capital cost to put in place. The following are the five types of remedial actions identified under phase 1 of the audit:

The Five Types of Remedial Actions

Type	Description
1	Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery
2	Remedial actions requiring changes in agency policies or procedures
3	Remedial actions requiring changes in monitoring coverage or interval
4	Remedial actions requiring significant capital expenditures
5	Remedial actions that may require significant capital expenditures but are not clearly definable at this time

Remedial Actions at Bonneville Hatchery - Coho

This section presents the corrective actions required to bring the Bonneville Hatchery - Coho program into compliance with IHOT performance measures. The remedial actions suggested here are just that, suggestions developed by the Montgomery Watson Audit Team. For some non-compliance areas, other remedial actions could be proposed. The required remedial actions are cross-referenced to each IHOT performance measure that was not in compliance. Where appropriate, the costs associated with the remedial actions are also presented (Table 3).

The cost estimates presented in this section are based on professional experience from similar projects. In most cases, only a lump-sum figure is presented, and detailed take-off lists have not been prepared. The cost estimates are essentially order of magnitude estimates ($\pm 40\%$).

More importantly, the suggested remedial activities may also present several levels of action. Optional actions have been listed for several problems. These optional actions are desirable for either operational or safety considerations.

Table 3. Remedial Actions Required at Bonneville Hatchery - Coho

Remedial Action Required	Cost	PMS ¹
Type 1 - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery		
None		
Type 2 - Remedial actions requiring changes in agency policies or procedures		
Review Operations Plan with staff	----	2
Develop smolt-to-adult survival goal for IHOT Operations Plan	----	4h
Install security alarms	----	6
Install telephone pagers	----	6
Follow IHOT recommendations for monitoring food production	----	12
Develop written rearing practices and standards for IHOT Operations Plan	----	19
Develop smoltification criteria for IHOT and implement measurement program	----	22a1
Follow IHOT transportation protocols	----	23
Follow IHOT recommendations for equipment and rain gear sanitation	----	28
Develop written broodstock collection plan and procedures	----	41
Develop Genetics M&E program	----	43

Remedial Action Required	Cost	PMS ²
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Run analysis for dissolved oxygen and dissolved nitrogen	----	5b
Run analysis for missing water chemistry parameters for Tanner Creek	----	5c
Run analysis for turbidity for Tanner Creek	----	5d
Run analysis for alkalinity and hardness for Tanner Creek	----	5e
Run analysis for nitrite for Tanner Creek	----	5f
Run analysis for contaminants for Tanner Creek	----	5g
Type 4 - Remedial actions requiring significant capital expenditures		
None	----	
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Improve conditions in ponds used for acclimation	----	4g
Review need for pathogen-free water for rearing and acclimation	----	5h, 20, 22a2

Hatchery Contribution to Fisheries, Spawning Grounds, and Hatcheries

This section presents the audit findings for the Bonneville Hatchery - Coho program contribution of adult fish to fisheries, local fisheries, spawning grounds, and hatcheries. Data is reported by broodyear. A broodyear refers to the adult contribution from the eggs produced from a single group of spawning adults. For some species, this may include fish caught as 2-, 3-, 4-, 5-, and 6-year old fish. Because of the return distribution and data processing delays, the complete adult contribution for a given broodyear may not be available until 4 to 5 years after the fish have been released from the hatchery.

**Table 4. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:
Bonneville Hatchery - Coho**

Year	Fisheries (Broodyear)	Spawning Grounds¹ (Broodyear)	Hatchery¹ (Broodyear)	Total Combined Contribution (Broodyear)	Smolt to Adult Survival (percent)
1981					
1982					
1983					

Data obtained from Missing Production Groups Annual Report or from the Regional Mark Information System database.

Total combined adult contribution; presented when it is not possible to subdivide the contribution into fisheries, spawning grounds, and hatchery contributions.

1984					
1985					
1986					
1987				29,395	1.67
1988				51,980	3.15
1989				35,350	2.05
1990				19,155	0.88
1991				25,126	2.26
1992					

Annual Operating Expenditures

The level and detail of annual operating expenditures varies widely depending on hatchery, operating agency, and funding source. When provided, expenditures were presented in terms of personnel costs, operating costs (power, feed, supplies), capital costs, indirect costs charged to the federal government, third-party costs, and other costs. These cost components were summed to determine a total hatchery annual cost. Based on discussion with the hatchery manager, the percent of total hatchery costs allocated to a given program was estimated. The total hatchery costs and the percent of hatchery costs allocated to a given program were used to compute the cost of a given program. Table 5 shows the annual operating expenses for the Bonneville Hatchery - Coho program. For programs that occur at more than one facility (as shown on Table 1 in Section 3 of this report), the cost breakdown for the component(s) at each facility is presented in separate tables (Tables 5a and 5b).

Table 5. Annual Operating Expenses: Bonneville Hatchery - Coho ^(a)

Hatchery	1994	1995	1996
1. Bonneville Hatchery (includes Oxbow Hatchery costs)	\$81,122	\$70,136	\$78,118
2. Oxbow Hatchery	\$219,959	\$143,200	\$98,781
3.			
4.			
5.			
Total Program Costs	\$301,081	\$213,336	\$176,899

(a) Includes Cascade Hatchery

The total expenditures for the Bonneville Hatchery are presented in Table 6 by program. The detailed breakdown of program expenditures at this hatchery are presented in separate tables (Tables 6a, and 6b).

Table 6. Annual Operating Expenses - Bonneville Hatchery

Program	1994	1995	1996
1. Coho	\$81,122	\$70,136	\$78,118
2. URB Fall Chinook	\$689,534	\$596,153	\$664,001
3. Tule Fall Chinook	\$851,777	\$736,424	\$820,236
4.			
5.			
Total Hatchery Costs	\$1,622,443	\$1,402,713	\$1,562,355

Table 5a. Annual Operating Expenses: Bonneville Hatchery - Coho

Expenditure Occurring at Bonneville and Cascade Hatcheries

Component	1994	1995	1996
Personnel Costs	\$630,358	\$546,837	\$615,680
Operational Costs	\$428,665	\$355,640	\$419,886
Capital Costs	\$31,494	\$2,594	\$0
Indirect Costs	\$231,926	\$197,642	\$226,789
Lumped Hatchery Costs			
Lumped Third-Party Costs	\$300,000	\$300,000	\$300,000
Total Hatchery Costs	\$1,622,443	\$1,402,713	\$1,562,355
Source of Funds			
Program Production (lb)			
Total Production (lb)			
Program as Percent of Total	5%	5%	5%
Program Costs	\$81,122	\$70,136	\$78,118

When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

20 million kwh/year @\$0.015 per kwh

Table 5b. Annual Operating Expenses: Bonneville Hatchery - Coho

Expenditure Occurring at Oxbow Hatchery

Component	1994	1995	1996
Personnel Costs	\$198,941	\$190,665	\$185,401
Operational Costs	\$156,758	\$90,519	\$57,624
Capital Costs	\$15,821	\$2,890	\$20,842
Indirect Costs	\$68,399	\$56,878	\$44,825
Lumped Hatchery Costs			
Lumped Third-Party Costs	\$0	\$0	\$0
Total Hatchery Costs	\$439,918	\$340,952	\$308,692
Source of Funds			
Program Production (lb)	46,250	53,748	46,250
Total Production (lb)	91,627	125,332	142,229
Program as Percent of Total	50%	42%	32%
Program Costs	\$219,959	\$143,200	\$98,781

When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

20 million kwh/year @\$0.015 per kwh

Table 6a. Detailed Expenditures at Bonneville Hatchery by Program

Coho

Component	1994	1995	1996
Personnel Costs	\$630,358	\$546,837	\$615,680
Operational Costs	\$428,665	\$355,640	\$419,886
Capital Costs	\$31,494	\$2,594	\$0
Indirect Costs	\$231,926	\$197,642	\$226,789
Lumped Hatchery Costs			
Lumped Third-Party Costs	\$300,000	\$300,000	\$300,000
Total Hatchery Costs	\$1,622,443	\$1,402,713	\$1,562,355
Source of Funds			
Program Production (lb)			
Total Production (lb)			
Program as Percent of Total	5%	5%	5%
Program Costs	\$81,122	\$70,136	\$78,118

When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

20 million kwh/year @\$0.015 per kwh

Table 6b. Detailed Expenditures at Bonneville Hatchery by Program

URB Fall Chinook

Component	1994	1995	1996
Personnel Costs	\$630,358	\$546,837	\$615,680
Operational Costs	\$428,665	\$355,640	\$419,886
Capital Costs	\$31,494	\$2,594	\$0
Indirect Costs	\$231,926	\$197,642	\$226,789
Lumped Hatchery Costs			
Lumped Third-Party Costs	\$300,000	\$300,000	\$300,000
Total Hatchery Costs	\$1,622,443	\$1,402,713	\$1,562,355
Source of Funds			
Program Production (lb)			
Total Production (lb)			
Program as Percent of Total	42.5%	42.5%	42.5%
Program Costs	\$689,534	\$596,153	\$664,001

When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

20 million kwh/year @\$0.015 per kwh

Table 6c. Detailed Expenditures at Bonneville Hatchery by Program

Tule Fall Chinook

Component	1994	1995	1996
Personnel Costs	\$630,358	\$546,837	\$615,680
Operational Costs	\$428,665	\$355,640	\$419,886
Capital Costs	\$31,494	\$2,594	\$0
Indirect Costs	\$231,926	\$197,642	\$226,789
Lumped Hatchery Costs			
Lumped Third-Party Costs	\$300,000	\$300,000	\$300,000
Total Hatchery Costs	\$1,622,443	\$1,402,713	\$1,562,355
Source of Funds			
Program Production (lb)			
Total Production (lb)			
Program as Percent of Total	52.5%	52.5%	52.5%
Program Costs	\$851,777	\$736,424	\$820,236

When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

20 million kwh/year @\$0.015 per kwh

PMs are performance measures that were extracted from the IHOT 1995 report. The IHOT performance measures are listed in Table 2 (Section 3 of this report) in numerical order.

PMs are performance measures that were extracted from the IHOT 1995 report. The IHOT performance measures are listed in Table 2 (Section 3 of this report) in numerical order.